2.0 Description of the Proposal and Alternatives

2.1 Project Proponent

The proponent of the North Totten Inlet Mussel Farm is Taylor, Inc., based in Shelton, Washington. Taylor Shellfish Company, Inc. (Taylor) is a family-owned business\(^1\) that has engaged in shellfish aquaculture in Totten Inlet since 1969. The company is the largest shellfish grower in the State of Washington, with operations in several locations that include Puget Sound, Hood Canal, Samish Bay, and Willapa Bay.

2.2 Purpose and Objectives of the Proposal

The purpose and objectives of the proposed action are to:

- Cultivate “Mediterranean” (also known as “Gallo”) mussels (\textit{Mytilus edulis galloprovincialis}) for harvest, sale, and distribution in local, State, national and international commercial shellfish markets, using mussel raft culture practices.
- Construct an economically viable addition to the existing Taylor North Totten Inlet mussel farm within Totten Inlet.

Taylor is currently the leading producer of farmed shellfish (mussels, oysters, clams and geoducks) on the West Coast of the United States. Taylor’s current annual production of mussels from farms in Washington is approximately 1.2 million pounds. Market demand indicates that an additional one million pounds per year would be consumed if available. The National Oceanic and Atmospheric Administration (NOAA) \textit{10-Year Plan for Marine Aquaculture} (October 2007) describes a 32 percent increase in seafood consumption per capita between 1980 and 2006, attributed to nutritionists encouraging Americans to double their seafood consumption for heart health.

Taylor mussel farms help the company maintain their diverse product line and sustain both a domestic and international customer base. Additional production from the Totten Inlet mussel farm at the North Totten Inlet site would also help reduce the seafood trade deficit (i.e., the importation of farmed mussels from other countries). Imports comprised more than 80 percent of the U.S. edible seafood supply in 2006 (round weight), and the U.S. seafood trade deficit for edible products was $9.1 billion in that same year (U.S. Department of Commerce, Fisheries of the United States, 2006).

Taylor currently operates two existing mussel farms in Totten Inlet. Addition of the 58-raft mussel culture proposal would allow the company to realize operational efficiencies in the form of labor, boat trips, truck trips, and maintenance work. The increase in production associated with the proposed mussel farm would create jobs for 8 full-time employees: 4 on-farm positions, and 4 off-farm positions (personal communication with Gordon King, Mussel Department Manager, Taylor Shellfish Company, Inc., March 6, 2009).

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1 Taylor Shellfish Company, Inc. is a Washington corporation, wholly-owned by the Taylor Family: the three children of Justin and Carol Taylor, as well as their spouses and children.
2.3 Location

Totten Inlet is located in South Puget Sound, west of Olympia, Washington (see Figure 2-1). Totten Inlet is located between Hammersley Inlet on the north and Eld Inlet on the south. The border between Thurston County and Mason County in the centerline of Totten Inlet in its east/west orientation. The proposed site of the North Totten Inlet mussel farm is within Thurston County.

The aquatic lands proposed as the site for the North Totten Inlet Mussel Farm encompass submerged lands approximately 600 feet waterward of the mean lower low water (MLLW) mark of the west shoreline of Steamboat Island, between approximately 85th Avenue NW and 90th Avenue NW (see Figure 2-2). The tidelands adjacent to the proposed mussel farm site are part of a farm 1.6 miles in length owned and operated by Taylor that includes the Gallagher Cove mussel farm. The proposed North Totten Inlet mussel farm raft configuration would be located approximately mid-way through the length of Taylor’s tideland ownership. The outside boundary of the mussel rafts would extend waterward a distance of approximately 1,200 feet from the 0.0 foot MLLW tidal elevation line (see Figure 2-3). This location is in the southeast ¼ of Section 5, Township 19 North, Range 2 West, Willamette Meridian; Thurston County, Washington.

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2 The Washington State Legislature passed the Bush and Callow Acts in the late 1890s to encourage the use of State tidelands for oyster cultivation. The Acts provided for the sale of State tidelands for the purpose of shellfish farming. These Acts were later amended to allow clam (as well as oyster) farming. While the Acts were effectively repealed in the 1930s, the repeal did not affect the validity of ownership transfers that preceded the repeal. The tidelands adjacent to the proposed North Totten Inlet mussel farm site, landward to the government meander line, were transferred from the State to H.R. Weatherall in 1905 in accordance with the Bush Act. After a series of intervening transfers, Justin Taylor acquired these tidelands in 1969. Then in the 1970s, Justin Taylor sold the tidelands to Taylor United – present owner of these tidelands. (Taylor United is a Washington corporation wholly-owned by the three children of Justin and Carol Taylor, as well as their spouses and children [the “Taylor Family”].) These tidelands have been used for shellfish farming since at least the 1950s by Taylor’s predecessors. Taylor has farmed these tidelands for shellfish farming since Justin Taylor acquired them in 1969.
Figure 2-1: Vicinity Map

1: Existing DeepWater Point Mussel Farm Site
2: Kamilche Sea Farms Long-Line Mussels Site
3: Existing Gallagher Cove Mussel Farm Site
4: Proposed North Totten Inlet Mussel Farm Site
5: Taylor Shellfish Old Plant Site
6: Existing Taylor Shellfish Processing Plant
Figure 2-3: Taylor Shellfish Co. Tidelands Ownership within Totten Inlet
2.4 Alternative 1, the Preferred Alternative

The Preferred Alternative for the North Totten Inlet Mussel Farm is a 58-raft proposal that will occupy approximately 1.36 acres within an Aquatic Lands Lease area approximately 11.25 acres in size (see Figure 2-4). The lease area will begin about 550 to 600 feet waterward of Mean Lower Low Water (MLLW), and will extend approximately 700 feet further offshore. The length of the lease area will be approximately 700 feet parallel to the shoreline (490,000 sf total).

The species to be cultivated is *Mytilus edulis galloprovincialis*. Taylor has cultivated this species of mussel at its two existing farms within Totten Inlet since 1992 (Gallagher Cove) and 1994 (Deepwater Point).

2.4.1 Principal Features of Proposed Development

Each raft in the Alternative 1 configuration will be 30 feet by 34 feet in dimension. Rafts will be attached end to end (with 2 feet in between) to make up raft units of varying length. It is anticipated that there will be two 8-raft units and six 7-raft units (see Figure 2-4). The longitudinal axis of each raft unit will be parallel to the shore. The raft units will be aligned in a single row of four 2-raft unit groups extending waterward from the shore. There will be approximately 40 feet separating raft units within each group, and 70 feet separating each group. The total water surface coverage will be about 1.36 acres.

The rafts will be constructed of natural, untreated lumber (Douglas fir), welded aluminum cross beams, and 55-gallon recycled food product barrels (for floatation devices). Synthetic “socks” and ropes will be suspended from the raft structure (see Figure 2-5). These will be stocked with hatchery-reared seed mussels. These mussels will be periodically thinned and reset as each mussel crop matures. The wooden raft structure would extend 1 to 2 feet above the water surface elevation (lowest at times when the mussels in the socks have grown to maximum harvest size). Each raft unit will be secured in-place at both ends with nylon lines (rope) and concrete wedge anchors (see Figure 2-6).

Predator nets will enclose the underwater features of the rafts to exclude fish, marine birds, and marine mammals (see Figure 2-5). The mesh size of the nets will be changed during the growth of the mussels, initially to exclude predation by fish when the mussels are small; later to exclude diving ducks when the mussels are larger. Changing the nets prevents them from becoming excessively fouled by other organisms, which would cause the nets to become very heavy and block the flow of water through the grow-out lines of mussels. Material that falls into the nets from the rafts will be periodically removed for disposal on land during routine maintenance activities. Taylor staff will dive the site regularly (approximately once per week as they do at the present time between the Deepwater Point and Gallagher Cove mussel farms), in different areas at different times. The diver will manually remove debris (e.g., pieces of rope, weights, dropped tools, and seed frames) from the substrate (sea floor) at least two times per year (personal communication with Gordon King, Mussel Department Manager, Taylor Shellfish Company, Inc., March 6, 2009). Mussels that slough off the rafts and fall into the subsurface predator net will be pumped from inside the net onto a barge for disposal (personal communication with Gordon King, Taylor Shellfish Company, Inc., May 31, 2009).

Canopy predator nets are generally not used over the exposed surface of mussel rafts. For a short period (approximately 4 weeks) after the grow-out lines are first seeded, the “nursery” raft will be covered with black tarpaulin that functions as shade cloth (personal communication with Gordon King, Mussel Department Manager, Taylor Shellfish Company, Inc., May 19, 2009).
Figure 2-4. Principal Features of Proposed North Totten Inlet Mussel Farm (Alternative 1)

Notes:
- Depth contours relative to 0.0 feet MLLW.
- Coordinates are from the Universal Transverse Mercator (UTM) coordinate system, Zone 10T.

Proposed Aquatic Lands Lease Area: 700 ft x 700 ft
- Two 8-raft units and six 7-raft units
- Raft width 34 feet, length 30 feet
- Separation between rafts: 40 feet
- Separation between pairs of rafts: 70 feet
Figure 2-5: Cross-Section Appearance of Proposed Mussel Rafts
Figure 2-6: Typical Concrete Anchor Block
In general, there will be workers on some of the mussel rafts 5 or 6 days per week year-around between approximately 8:00 AM and 3:00 PM. During the summer months, work hours may be earlier. During winter months, work hours may be less due to very cold temperatures. At times, there may be no workers on the rafts for several days at a time. Saturdays are generally a day off, unless there is catch-up work to do. Sunday work is generally limited to harvest for one-half day or less, usually in the morning. Taylor employees who work on the mussel rafts park their vehicles at the Old Plant site at the end of Hargis Road. They reach the tender\(^3\) moored offshore from the Old Plant using a skiff that is kept at the Old Plant site (personal communication with Gordon King, Mussel Department Manager, Taylor Shellfish Company, Inc., February 17, 2009).

### 2.4.2 Culture Methods

Each raft will have multiple grow-out lines suspended from it: approximately 720 lines, 16 feet long (see Figure 2-5). The grow-out lines (an inert plastic mesh) will be seeded (by hand) with immature mussels that require approximately 14 to 18 months to reach harvestable size. The estimated biomass at the time of seeding is 1,520 pounds wet weight. It is estimated that each raft will generate an average of 20,183 pounds whole body, wet weight (meat + shell – cavity liquid) for sale per growing period. The growing period averages 16 months (range: 14 to 18 months). It is estimated that the 58 rafts in the Alternative 1 configuration would produce an average of 877,963 pounds (whole body, wet weight) of mussels for sale each year.

### 2.4.3 Harvest Methods

When mussels are ready to harvest from the grow-out lines, a submersible aluminum platform will be towed by a tender into place adjacent to a line of rafts. The platform will be submerged to a depth of approximately 20 feet, and will not rest on the bottom. The raft to be harvested will be slid out of line, and approximately 10,000 pounds of wet biomass (mussels and other organisms attached to the mesh) will be cut off and dropped onto the platform.\(^4\) The platform will be winched up using the crane on the tender. Workers wearing gloves will strip the mussels and other organisms off the mesh by hand. The mesh and fouling organisms will be sorted out from the mussels for upland disposal. Steel forks will be used to load the mussels into wooden fish totes on the tender. The totes – each weighing approximately 1,100 pounds when loaded – will be transported back to the beach, where the crane will be used to lift the totes onto a flatbed truck for transport to the Taylor Shellfish upland plant in Mason County for processing. At the processing plant, mussels will be “declumped,” washed, sorted by size, and packed for shipping. The weight of mussels sold averages about 25,000 pounds per raft per grow-out cycle (personal communication with Taylor representatives, March 17, 2009).

Mussel harvest from the rafts will not involve any dredge harvesting, tilling, or harrowing of bottom sediments.

### 2.4.4 Upland Support Facilities

Construction of the raft components will occur at a 130-acre upland site owned and operated by Taylor in Mason County. The raft parts and concrete anchors will be prefabricated at the Lynch Road shop. Pontoons and beams will be transported on an oyster tub truck and trailer to the Taylor Shellfish “Old

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\(^3\) A tender is a flat-decked marine vessel (work boat) equipped with a crane, used for transport and hauling to service the Taylor Shellfish mussel farms in North Totten Inlet.

\(^4\) The harvesting process will occur multiple times at each raft, as the wet biomass weight is typically 30,000 to 70,000 pounds (approximately 43,000 pounds, average) per grow-out cycle per raft.
Plant” site on the Totten Inlet shoreline, at the end of Hargis Road (see Figure 2-2). These units will be unloaded using the crane on the truck. Assembly (welding parts together and attaching empty barrels as floatation devices) will occur in the upper beach area, at approximately the +6 ft to +8 ft MLLW elevation. This beach is currently used almost daily for delivering mussels, geoducks and oysters harvested in Totten Inlet. No new beach area will be disturbed by raft assembly for the North Totten mussel farm site. Assembled rafts will be floated off the beach on an incoming tide. Assembly takes about 2 hours per raft. Floating and anchoring the rafts into place within the lease area will take about 2 to 4 hours per raft (personal communication with Gordon King, Mussel Department Manager, Taylor Shellfish Company, Inc., March 17, 2009).

The Old Plant was historically the location of an oyster shucking plant, purchased by Justin Taylor in 1969. The shucking plant has been removed, but the site is still a staging area and shoreline access site used by Taylor. The North Totten Inlet Mussel Farm proposal will not require any alteration of the Old Plant site or of the Lynch Road shop facilities.

All processing will occur at the Taylor Shellfish Lynch Road plant (see Figure 2-1). A 20,000 square foot new shellfish processing plant and support facilities were constructed on the Taylor Shellfish upland site (SE 130 Lynch Road) in Mason County in 2004, with adequate capacity to serve growth in the company’s operation. The processing plant has state-of-the-art wastewater and stormwater management facilities, and operates under the conditions of a Washington State Waste Discharge permit for land application issued by the Department of Ecology. The North Totten Inlet Mussel Farm proposal will not require any alteration of the Lynch Road processing plant.

2.4.5 Phased Implementation Proposal

Full development of the North Totten Inlet mussel farm will occur over a period of approximately 5 years or less. The first phase will likely consist of 12 to 24 rafts, depending on the availability of mussel “seed” to start the first crop, market demand, and the availability of financial resources to construct and initiate the farm. Subsequent phases would likely consist of 12 to 20 rafts per year up to the 58-raft total. The availability of seed, financial resources, and market demand would also be the determining factors for the size of subsequent phases of mussel farm development (personal communication with Gordon King, Mussel Department Manager, Taylor Shellfish Company, Inc., February 17 and May 19, 2009).

2.4.6 Permits and Approvals Required

2.4.6.1. Shoreline Substantial Development Permit. The Washington State Shoreline Management Act (SMA) (RCW 90.58) regulates development and use of certain river, lake, and marine shorelines within the State. Local governments (cities and counties) are required to adopt Shoreline Master Programs (SMPs) to implement the SMA. The purpose of local SMPs is to apply the State law to shorelines within each jurisdiction. Local SMPs must be consistent with the SMA and with State administrative regulations adopted pursuant to the Act. The Act provides for regulation of shoreline development and use in two principal ways: 1) through policies and regulations that define permitted uses and activities; and 2) by requiring permits for certain types of development or use. Washington State Shoreline Management Act shoreline use standards identify aquaculture as a beneficial use of the State’s shorelines (WAC 173-26-241[3][b]):

Properly managed, it can result in long-term over short-term benefit and can protect the resources and ecology of the shoreline. Aquaculture is dependent on the use of the water area and, when consistent with control of pollution and prevention of damage to the environment, is a preferred use of the water area. Local government should consider ecological conditions and
provide limits and conditions to assure appropriate compatible types of aquaculture for the local conditions as necessary to assure no net loss of ecological functions.

The goal of the Thurston County Shoreline Master Program (SMP)\(^5\) is to preserve to the fullest extent possible the scenic, aesthetic and ecological qualities of the shorelines of the County in harmony with those uses that are deemed essential to the life and well-being of its citizens. The overall policy of the Thurston County SMP\(^6\) is to provide for the management of the shorelines of the State and region by planning for and fostering all reasonable and appropriate uses (Thurston Regional Planning Council, May 15, 1990).

Totten Inlet, as a marine water of the Thurston Region, is within a Conservancy shoreline environment\(^7\). The Conservancy Environment designates shoreline areas for the protection, conservation and management of existing valuable natural resources and historic and cultural areas. This environment is characterized by low-intensity land use and moderate-intensity water use with moderate to little visual evidence of permanent structures and occupancy\(^8\). The intent of the Conservancy Environment designation is to protect, conserve and manage existing resources and valuable historic and cultural areas in order to ensure a continuous flow of recreational benefits to the public, and to achieve sustained resource utilization. The preferred uses are non-consumptive of the physical and biological resources of the area, and activities and uses of a nonpermanent nature that do not substantially degrade the existing character of the area. Non-consumptive uses are those uses that utilize resources on a sustained-yield basis while minimally reducing opportunities for other future uses of the resources of the area.\(^9\)

The North Totten Inlet Mussel Farm proposal will be evaluated in relation to the goals, policies, and development standards of the Thurston County Shoreline Master Program. The project will require a Thurston County Shoreline Substantial Development Permit. This permit will specify development regulations and performance standards under which the proposed mussel farm can be located and operated in order to achieve compliance with the local SMP and the State SMA.

In 2003, the Washington Department of Ecology adopted new Shoreline Guidelines (WAC 173-26) that require local governments (including Thurston County) to update their Shoreline Master Programs to contain policies and regulations that will ensure no net loss of shoreline ecological functions. The schedule for Thurston County to complete their SMP update is 2011. Therefore, it is anticipated that the North Totten Inlet mussel farm proposal will be evaluated under the County’s existing SMP.

2.4.6.2. Hydraulic Project Approval. Hydraulic Project Approval (HPA) will not be required. The authorities granted to the Washington Department of Fish and Wildlife (WDFW) by the Revised Code of Washington limit WDFW’s regulatory powers to disease inspection and control for the purpose of protecting the aquaculture industry and wildstock fisheries from a loss of productivity due to aquatic diseases or maladies (RCW 77.115.010[1]). This interpretation was upheld in an opinion issued by the Office of the Attorney General of the State of Washington (AGO 2007-001).

2.4.6.3. Department of the Army, Corps of Engineers Permit for Commercial Shellfish Aquaculture Activities. Section 10 of the Rivers and Harbors Act of 1899 requires a Federal permit from the Department of the Army, Corps of Engineers (Corps) for any structures or work in navigable waters of the United States. Nationwide Permit (NWP) 48 authorizes the installation of buoys, floats, racks, trays,

\(^{5}\) Thurston County SMP, Section Two, page 19.
\(^{6}\) Thurston County SMP, Section Two, page 20.
\(^{7}\) Thurston County SMP Section Five, page 144.
\(^{8}\) Thurston County SMP Section Two, page 28.
\(^{9}\) Thurston County SMP Section Two, page 28.
nets, lines, and other structures necessary for the continued operation of an existing commercial aquaculture activity. Taylor’s existing mussel farms within Totten Inlet—the 21-raft Gallagher Cove mussel farm and the 48-raft Deepwater Point farm—operate in accordance with the conditions of NWP 48. The preferred alternative (Alternative 1) for the current proposal would add a 58-raft mussel farm further north, covering a footprint not previously used for mussel aquaculture. The applicant (Taylor Shellfish Company, Inc.) must submit a Joint Aquatic Resources Permit Application (JARPA) to the Corps for an Individual Section 10 Permit. This permit must be acquired before Taylor proceeds with construction and operation of the North Totten Inlet mussel farm under any alternative configuration. Proposed culture methods and harvest methods are described above in Draft EIS Sections 2.4.2 and 2.4.3.

Additional certifications and approvals required in support of the Corps permit application include: compliance determinations related to potential effects on Threatened or Endangered Species Federally-listed under the Endangered Species Act (ESA); potential effects on critical habitat for Threatened or Endangered Species (compliance with the Magnuson-Stevens Fishery Conservation and Management Act); a Coastal Zone Management Act (CZMA) consistency determination; and U.S. Coast Guard requirements for the installation of private aids to navigation. A Biological Evaluation (BE) will be prepared to evaluate the potential effects of the project on Federally-listed species and essential fish habitat (EFH). Individual Section 401 Water Quality Certification under the Clean Water Act (to assure that an activity will comply with the water quality standards of the certifying Federal agency or Tribe) is not required for projects that require a Section 10 Rivers and Harbors Act permit from the Corps for structures or work in navigable waters of the U.S., since the project does not involve discharge of dredge or fill material to waters of the U.S.

2.4.6.4. Endangered Species Act (ESA) and Magnuson-Stevens Fishery Conservation and Management Act Compliance Determination. The National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) – collectively referred to as “the Services” – have listed or proposed for listing more than 50 species of plants, fish, birds and other species in or near Pacific Northwest waters as endangered or threatened under the Federal Endangered Species Act (ESA) of 1973. In addition, the habitat for some of these listed species has also been designated under the ESA as critical for their conservation. In accordance with Section 7 of the ESA, the U.S. Army Corps of Engineers is required to consult with the Services on any work proposed in an application for a Department of the Army permit that may affect a Federally-listed species or its designated critical habitat. The North Totten Inlet mussel farm site is located within an area known to be (or potentially) used by Puget Sound Chinook salmon, steelhead trout, bull trout, Southern Resident killer whale, and marbled murrelet; and within designated critical habitat for Chinook salmon and Southern Resident killer whale. Though no longer listed under ESA, bald eagles – known to nest and forage near Totten Inlet – are protected under other Federal regulations. Under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), essential fish habitat (EFH) has been defined for salmon (Chinook, coho, and pink), pelagic, and groundfish species that are managed under the jurisdiction of this Act. Consultation for compliance with the MSFCMA will occur simultaneously with consultation required under the ESA. When Taylor Shellfish submits a JARPA to the Corps for an Individual Section 10 Permit to implement the North Totten Inlet mussel farm, a BE will be prepared to accompany the JARPA. This will be used by the Corps as the base document for its consultation with the Services to ensure compliance with ESA and EFH protection requirements (as described above in Section 2.4.6.3).

2.4.6.5. Aids to Navigation Compliance. The mussel raft installation will comply with U.S. Coast Guard aids to navigation requirements set forth in 33 CFR, Parts 62 and 66. Marine marker lights on buoys will be required to mark the boundary of the proposed mussel raft, and/or lights on the ends of each

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10 The intertidal area to Extreme Low Water was used for oyster cultivation by various owners, including Taylor Shellfish, for more than 100 years (beginning in 1905).
raft to identify the obstruction on the water surface (personal communication with Timothy Westcott, Private Aids to Navigation Manager, USCG, May 28, 2009). Taylor routinely installs two solar-powered navigation lights to identify the width of the raft structure, and as a back-up in case one of the lights burns out. These and other measures that may be required on a case-by-case basis are described in Draft EIS Section 3.6.

2.4.6.6. Aquatic Lands Lease. State-owned aquatic lands are managed by the Washington Department of Natural Resources (WDNR) under the administrative rules of Chapter 332-30 WAC, to promote uses and protect resources of State-wide value. It is the purpose of aquatic land planning to manage these lands in a manner that allows for multiple use by compatible activities to the greatest extent feasible (Section 332-30-107 WAC). Management goals include: to foster water-dependent uses; ensure environmental protection; encourage direct public use and access; promote production on a continuing basis of renewable resources; allow suitable State aquatic lands to be used for mineral and material production; and generate income from the use of aquatic lands in a manner consistent with these goals (Section 332-30-100 WAC).

The Aquatic Land Management regulations do not supersede laws and regulations administered by other governmental agencies covering activities falling under their jurisdiction on these same lands. For this reason, the Aquatic Lands Lease will be the last approval to be executed, after permits required from all other local, State and Federal agencies have been issued.

The proposed North Totten Inlet mussel farm will be located approximately 550 to 600 feet waterward of Mean Lower Low Water (MLLW), and will extend approximately 700 feet further offshore, covering a range of tidal elevations between approximately 15 feet and 70 feet as measured during Mean Low Water (MLW). The project will require an Aquatic Lands Lease from WDNR for the use of State-owned tidelands. The lease agreement will include performance standards and operational procedures that govern the proposed aquaculture practices. Taylor proposes to apply for an 11.2-acre lease. The lease area is determined by the surface area to be occupied by the mussel rafts plus the open water area needed to operate the mussel farm (Section 332-30-122 WAC).

2.5 Other Alternatives Considered

The Washington State Environmental Policy Act (SEPA) requires an Environmental Impact Statement (EIS) to evaluate reasonable alternatives that could feasibly attain or approximate the objectives of the proposal, but at a lower environmental cost or decreased level of environmental degradation. The word “reasonable” is intended to limit the number and range of alternatives, as well as the amount of detailed analysis for each alternative. SEPA also requires that the No Action Alternative shall be evaluated and compared to other alternatives. The level of detail in the description of each alternative may vary. One alternative may be identified as Preferred, and may be used as a benchmark for comparing the alternatives. The Preferred Alternative (Alternative 1) is described above in Draft EIS Section 2.4. Other alternatives are compared to the characteristics of the Preferred Alternative. The EIS may also describe alternatives that were considered and eliminated from detailed study (Chapter 197-11-440[5] WAC). These are described in Draft EIS Section 2.5.3, below.

2.5.1 Alternative 2, the Two-Row Raft Alternative

Localized and sometimes adverse effects on bottom-dwelling organisms (benthos) will occur directly beneath the rafts and for a short distance beyond the footprint of the mussel rafts (see Chapter 3). These effects will be seasonal (during summer months) when food is plentiful in the water for mussels (e.g., phytoplankton, bacterioplankton, and to a certain extent microzooplankton), with the result that feces and pseudofeces will be produced in greater quantities at this time of year. During colder conditions when the
metabolism of mussels shows down, all other characteristics of productivity also slow down, and the area beneath the rafts will naturally assimilate the nutrients contributed by the mussel rafts. As a measure to minimize seasonal effects on benthic organisms, an alternative raft configuration was considered, along with an alternative mussel farm management strategy in which these rafts would be relocated every 3 years into the adjacent gap between rafts to allow any build-up beneath the rafts to assimilate at a faster rate. An extra set of anchors would be required mid-way between the initially-installed rows and outside of the deepest row to facilitate this periodic raft relocation.

The Two-Row Alternative (Alternative 2) would consist of 50 rafts (see Figure 2-7) within a 16-acre Aquatic Lands Lease area (730 ft inshore to offshore, by 950 ft in length). Each raft in this alternative would be approximately 30 feet by 40 feet in dimension. There would be 10 raft units of five rafts in each. Rafts would be attached end to end (with 2 feet between) within each 5-raft unit. As with the Preferred Alternative (Alternative 1), the longitudinal axis of each raft unit would be parallel to the shore. These would be configured so that there would be two rows of 5-raft units extending waterward from the shore, with approximately 210 feet between each row. Within each row, each raft-unit would be 100 feet from the adjacent waterward raft-unit. The total water surface coverage would be about 1.38 acres. Alternative 2 would produce approximately the same yield per grow-out period as the 58 rafts in Alternative 1, or an average of 878,000 pounds of mussels for sale each year.

Alternative 2 could have environmental benefits in the form of minimizing effects on bottom sediments and bottom-dwelling organisms, while still functioning as an economically viable operation.

Disadvantages of this alternative would include: additional anchors in the bottom substrate, and raft units that would not be interchangeable with other Taylor mussel farms (due to the 40-foot length rather than 34 feet).

There would be no notable difference in the permitting requirements for Alternative 2 compared to Alternative 1.

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11 The landward edge of the lease area would be approximately 600 feet below MLLW, the same as the Preferred Alternative. The 730-ft width of the Alternative 2 lease area would therefore extend a distance of approximately 1,330 feet from MLLW.
Figure 2-7. Principal Features of Two-Row Raft Alternative (Alternative 2)

Notes:
Alternative Aquatic Lands Lease Area: 950 ft x 730 ft
Ten 5-raft units
Raft width 40 feet, length 30 feet
Separation between rafts: 100 feet east/west, 210 feet north/south

Notes:
Depth contours relative to 0.0 feet MLLW.
Coordinates are from the Universal Transverse Mercator (UTM) coordinate system, Zone 10T.
2.5.2 Alternative 3, the No Action Alternative

Under the No Action Alternative, no new mussel farm would be created at the North Totten Inlet site.Existing mussel rafts in Totten Inlet would continue to grow *Mytilus edulis galloprovincialis*: the Gallagher Cove 21-raft farm, and the Deepwater Point 48-raft farm operated by Taylor, and the floating long-line system operated in the Deepwater Point area by Kamilche Sea Farms. The Kamilche Sea Farms operation is permitted to cover up to 50 percent of their 6- to 8-acre lease area. Currently, the Kamilche Sea Farms operation consists of eight long-lines with lantern-shaped mesh cages attached to empty 50-gallon barrels (as floatation devices).

Under the No Action Alternative, there would be no additional Aquatic Lands Lease issued by WDNR, no physical presence of rafts, and no potential changes to the local water chemistry, flow (ambient current velocity), or minor effects on the local ecosystem or bottom sediments. On the other hand, there would be no increase in the beneficial effects of shellfish farming in Totten Inlet. As described in the technical studies performed for the proposed action, summarized in Draft EIS Chapter 3, Totten Inlet is becoming increasingly eutrophic. There is a significant body of scientific evidence that indicates the filtering capacity of mussels results in a net reduction in nitrogen in the water column that can help reduce the negative effects to the system from continued or increasing eutrophication attributable to human sources (such as inadequate wastewater treatment in septic systems, and the application of fertilizers to lawns and landscaping).

There would also be economic, employment, and food supply impacts associated with the No Action Alternative. These non-environmental issues are not evaluated in this EIS, but may be considered by Thurston County decision makers at their discretion, in accordance with WAC 197-11-448.

2.5.3 Alternatives Considered and Eliminated from Detailed Study

2.5.3.1. Gallagher Cove Expansion. The original Taylor, Inc. Shoreline Substantial Development Permit application (November 13, 1996) for expanding their mussel culture operations in Totten Inlet was a proposal to increase the number of rafts at the Gallagher Cove site from 21 rafts to 42 rafts, and add 58 rafts further north, at the North Totten Inlet site that is the subject of the current proposal. The alternative to double the size of the Gallagher Cove farm was rejected based on initial concerns raised by the Washington Department of Fish and Wildlife (WDFW) that additional mussel rafts in this location would impact herring spawning on polychaete worm tubes located in the vicinity. This proposal was withdrawn, and WDFW subsequently withdrew their concerns.

2.5.3.2. North Totten Inlet More Northerly Site Location. The site originally identified for the North Totten Inlet mussel farm was located near the northernmost end of the Taylor tideland ownership, as far as possible from homes with views across the water. A dive survey revealed the presence of a wild geoduck bed in solid sand and mud substrate in the northwest corner of the originally-identified site. The estimated population was about 500 geoducks in an area one acre or less in size — well below a commercial threshold (Goodwin 1997). The proposed Aquatic Lands Lease area for the North Totten Inlet mussel farm was repositioned southward to the location identified as Alternative 1 (Preferred) in this Draft EIS (Figures 2-3 and 2-4) in order to avoid potential impacts to the wild geoduck population. The bottom substrate in the relocation area is soft mud (Goodwin 1997). The original proposal for the North Totten Inlet mussel farm was 108 rafts. In August 1997, the design was reduced and reconfigured with 58 rafts aligned in a single row — the current proposal for the Preferred Alternative (Alternative 1).

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12 Eutrophic waters are rich in mineral and organic nutrients, causing plant life (especially algae) to proliferate, thereby reducing the dissolved oxygen content, which can have a detrimental effect on other organisms.
2.6 Comparison of the Environmental Impacts of the Alternatives

Table 2.6-1 presents a comparison of the environmental impacts of the three alternatives for each element of the environment considered in this limited-scope EIS. Readers are encouraged to review more detailed information in Chapter 3 regarding the impacts summarized in Table 2.6-1 for a more complete, “in-context” understanding of these issues.

2.7 Benefits and Disadvantages of Reserving Project Implementation to Some Future Time

Project implementation has been delayed for an extended period of time already. The application for Shoreline Substantial Development Permit was first submitted to Thurston County on November 13, 1996, followed by a period of appeals and hearings regarding the County’s SEPA Threshold Determination. When the requirement for an Environmental Impact Statement to be prepared was upheld by the Thurston County Hearing Examiner on June 18, 1999, Taylor engaged a team of technical consultants to assimilate pertinent available scientific information on the effects of mussel culture in the marine environment, and to perform site-specific field studies. Thurston County retained a team of highly qualified scientists to serve as an Independent Technical Review Committee (ITRC), to advise the County regarding the acceptability of the work performed and conclusions drawn by Taylor’s technical consultant team. Several draft documents and review comments were exchanged over a period of 10 years (1999 to 2009). The County authorized preparation of the EIS to proceed on January 8, 2009.13 In the interim, Taylor has invested heavily in the project with no production from the site to recuperate these costs. They have been unable to increase their mussel aquaculture operations in Totten Inlet, and therefore have not provided a local response to increased market demand. If project implementation is further delayed, some other grower may expand their mussel aquaculture operations at some other location (for example, in Chile or Canada). This would result in lost income and employment opportunities in the local economy.

Human activities continue to contribute to eutrophication in Totten Inlet. The filtering effects of an increase in the mussel population of the Inlet would have an offsetting effect on eutrophication.

There are no known benefits to reserving project implementation to some future time.

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13 A complete record of the ITRC process is available in the form of electronic files on a CD from the Thurston County Resource Stewardship Department.
Table 2.6-1. Comparison of the environmental impacts of the alternatives.

<table>
<thead>
<tr>
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<tr>
<td>Water: Construction</td>
<td>There would be little risk of significant adverse impact to water circulation, dissolved oxygen, or nutrients in Totten Inlet during construction as fabrication would take place on an upland site, and raft assembly would occur on the beach at the Old Plant site.</td>
<td>Same as Alternative 1.</td>
<td>There would be no construction period effects to circulation of water column effects with the No Action Alternative.</td>
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<tr>
<td>Water: Operation</td>
<td>Current velocities close to the deployed rafts in the Alternative 1 configuration would be expected to increase above ambient velocities. The turbulent eddy and associated eddy friction would create a down-current eddy that would mix ambient water with raft-influenced water, and would affect about 2.36 acres. The volume of water passing through this portion of Totten Inlet is 0.43% of the total volume of water passing through the cross-sectional transect of North Totten Inlet.</td>
<td>Alternative 2 would have 91.8% more effect compared to Alternative 1. Alternative 2 would have 9.2% more effect compared to Alternative 1, but would not significantly affect the environment.</td>
<td>Water currents would not be affected under the No Action Alternative.</td>
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<td>Under Alternative 1, eight “zones of decreased dissolved oxygen” 70 to 200+ m (230 to 656 ft+) in length would be created, which would equate to surface area of approximately 2,906 to 8,288 m² (0.72 to 2.05 acres).</td>
<td>Alternative 2 would have 91.8% more effect compared to Alternative 1. If 200 m (656 ft) “zones” are assumed for Alternative 1, Alternative 2 would have 15.0% more effect compared to Alternative 1.</td>
<td>Dissolved oxygen levels would not change compared to existing conditions with the No Action Alternative.</td>
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<td>Due to high existing concentrations of silicates in Totten Inlet, silicate concentrations are not limiting diatom growth. The addition of the proposed North Totten Inlet mussel farm would not significantly alter the silicate cycle in Totten Inlet.</td>
<td>Same as Alternative 1.</td>
<td>There would be no change in aquatic silicate cycle at the site or in the surrounding water column with the No Action Alternative.</td>
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<td>Minor changes in phosphorus concentrations recorded as water passed through the Deepwater Point reference site raft array did not constitute a significant change in phosphorus levels. In addition, the effect of increased phosphorus concentrations on phytoplankton populations is expected to be minimal because nitrogen is the limiting nutrient during the summer.</td>
<td>Similar to Alternative 1.</td>
<td>There would be no change in aquatic phosphorus concentrations at the site on in the surrounding water column.</td>
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Table 2.6-1. Comparison of the environmental impacts of the alternatives, continued.

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<td><strong>Water: Operation, continued</strong></td>
<td>Inorganic nitrogen concentrations are expected to increase in the immediate vicinity of the proposed mussel farm during the months of June through September, with ammonium as the principal form present within the mussel raft. Predicted concentrations within the Alternative 1 configuration would approach WDOE criteria for high concentrations of ammonium (&gt;5 µM).</td>
<td>Similar to Alternative 1.</td>
<td>There would be no change in aquatic inorganic nitrogen concentrations at the site or in the surrounding water column with the No Action Alternative.</td>
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<td>Nitrogen (N) removal through mussel assimilation and removal via harvest is considered a beneficial effect in South Puget Sound. Nitrogen removal by Alternative 1 would represent 17 to 40% of the nitrogen introduced to Totten Inlet by human activities.</td>
<td>Similar to Alternative 1.</td>
<td>There would be no increase in the beneficial effect of nitrogen removal with the No Action Alternative.</td>
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<td>The Alternative 1 footprint of ammonium effect would be approximately 2,906 m² (31,280 sq ft). Dissolved inorganic nitrogen (DIN) concentrations appear to return to ambient ammonium conditions approximately 70 m (230 ft) down-current from the mussel raft array; therefore, the ammonium effect is considered minor.</td>
<td>Alternative 2 would have 46% more effect than Alternative 1; however, this would still be a minor effect.</td>
<td>There would be no change in ammonium concentrations at the site.</td>
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<td><strong>Marine Plants: Construction</strong></td>
<td>There would be little risk of significant adverse impact to marine plants in Totten Inlet during construction as fabrication would take place on an upland site, and raft assembly would occur on the beach at the Old Plant site.</td>
<td>Same as Alternative 1.</td>
<td>Marine plants would not be affected under the No Action Alternative.</td>
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<tr>
<td><strong>Marine Plants: Operation</strong></td>
<td>During the spring/summer period, the project may remove approximately 0.3 to 0.9% of the primary production (phytoplankton) over 50% of the Northern Totten Inlet basin; whereas the North Totten Inlet mussel farm is predicted to remove 1.4 to 4.4% of the seasonal production relative to 10% of Totten Inlet.</td>
<td>Similar to Alternative 1.</td>
<td>There would be no change in spring/summer phytoplankton production in North Totten Inlet under the No Action Alternative.</td>
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<td>For the fall/winter period, the North Totten Inlet mussel farm may remove approximately 0.5 to 1.4% of primary production over 50% of Totten Inlet. The proposed project is predicted to remove approximately 1.1 to 7.3% of seasonal production relative to 10% of Totten Inlet.</td>
<td>Similar to Alternative 1.</td>
<td>There would be no change in fall/winter phytoplankton production in North Totten Inlet under the No Action Alternative.</td>
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Table 2.6-1. Comparison of the environmental impacts of the alternatives, continued.

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<td>Marine Plants: Operation, continued</td>
<td>Under Alternative 1, there is a potential for shading the sparse coverage of fixed macroalgae under the two shoreward raft units. The footprint of Alternative 1 raft units would be approximately 16,230 sq ft.</td>
<td>Under Alternative 2, there would be a potential for shading the sparse coverage of fixed macroalgae under the two shallow raft units in the northeast row, and the most shallow raft units in the southwest row. The footprint of Alternative 2 raft units would be 18,000 sq ft. Alternative 2 includes an alternative mussel farm management strategy in which the raft units would be relocated every 3 years into the adjacent offshore gap between rafts. During this relocation period, only two of the raft units would be located above the sparse density of attached macroalgae. This would reduce the potential shading by 6,000 sq ft, and would cover approximately 4,230 sq ft less than Alternative 1 during alternating 3-year periods.</td>
<td>There would be no risk of shading of macroalgae in North Totten Inlet under the No Action Alternative.</td>
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<td>Animals: Construction</td>
<td>There would be little risk of adverse impact to any types of animals during construction of the proposed mussel aquaculture facility as fabrication would take place on an upland site, and raft assembly would occur on the beach at the Old Plant site.</td>
<td>Same as Alternative 1.</td>
<td>There would be no change in existing conditions for all types of animals under the No Action Alternative.</td>
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<tr>
<td>Animals: Operation</td>
<td>Impacts to zooplankton attributable to operating the proposed mussel farm include indirect effects of removal of zooplankton food organisms, as well as direct effects in the form of removal of some zooplankton by mussel feeding. The Alternative 1 mussel raft array would create small areas of raft-affected water.</td>
<td>Similar to Alternative 1.</td>
<td>There would be no change in zooplankton under the No Action Alternative. No positive effects would occur, such as net removal of nitrogen from the ecosystem when mussels are harvested.</td>
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Table 2.6-1. Comparison of the environmental impacts of the alternatives, continued.

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<td>Animals: Operation, continued</td>
<td>The proposed mussel farm would be unlikely to create irreversible impacts to the hydrologic or biological health of this subbasin of Puget Sound. For every possible adverse effect to zooplankton, there would be mitigating positive effects, such as net removal of nitrogen from the ecosystem when the mussels are harvested, and provision of cover and food organisms for juvenile fish.</td>
<td>Similar to Alternative 1.</td>
<td>Same as above.</td>
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<td>A small amount (434 sq ft) of benthic habitat may be displaced by the concrete wedge anchors that would secure the Alternative 1 rafts in-place.</td>
<td>Up to 50% more benthic habitat (approximately 650 sq ft) would be displaced due to the extra anchor sets, compared to Alternative 1.</td>
<td>There would be no change in the characteristics of benthic macroinvertebrate fauna from an undeveloped site.</td>
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<td>Subtle infaunal community (i.e., benthic) effects are likely to extend between 45 m (148 ft) and 75 m (246 ft) down-current with the Alternative 1 mussel raft configuration, each row of eight, 34-foot wide raft units could be envisioned as resulting in triangular “zones” of effects to the benthos, both up-current and down-current on areas ranging between 0.92 acre to 1.54 acres. The low sulfide and total volatile solids (TVS) concentrations observed during the Deepwater Point study indicate that natural attenuation of substrate chemistry toward baseline conditions occurred very quickly with no evidence of cumulative effects. This suggests there would be no adverse long-term effect on benthic invertebrates arising from the proposed North Totten Inlet mussel farm.</td>
<td>Compared to similar calculations for the Alternative 1 raft units, the Alternative 2 configuration could have up to 45 to 48% greater effects on benthic organisms than Alternative 1, ranging from approximately 1.33 to 2.28 acres. An off-setting management feature of Alternative 2 would relocate raft units every 2 to 3 years to allow the infaunal community to be restored down-current from the former raft unit locations. This procedure, however, will still result in a similar amount of effect. The effects would, however, be temporary and would occur at different locations and different times.</td>
<td>Under this alternative, there would be no impacts to macroinvertebrates (benthic organisms).</td>
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<td>The risk of <em>M. e. galloprovincialis</em> to displace or “genetically pollute” <em>M. e. trossulus</em> stocks in Puget Sound is low, and it is unlikely that the proposed project will have a significant adverse effect.</td>
<td>Same as Alternative 1.</td>
<td>There would be no change in the effect on native mussel species in North Totten Inlet if the No Action Alternative were selected.</td>
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Table 2.6-1. Comparison of the environmental impacts of the alternatives, *continued*.

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<td><strong>Animals: Operation, <em>continued</em></strong></td>
<td>Under Alternative 1, there could be positive effects for fish because encrusting organisms that will form on the raft structures and anchor cables will supply food for several species of fish, including surf perches.</td>
<td>There would be up to 25% more anchor lines and structure surface with the Alternative 2 configuration, compared to Alternative 1.</td>
<td>There would be no change in the use of North Totten Inlet by fish species if the No Action Alternative were selected. Additional food organisms and cover produced under either action alternative would not be available.</td>
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<td>Because the rafts will displace a very small amount of the surface area of Totten Inlet and the activity will not result in noise levels that would differ from existing conditions, the proposed project is unlikely to have a significant adverse effect on birds.</td>
<td>Similar to Alternative 1. To the extent that birds would perch on the raft units, there would be two more (25% more) raft units in Alternative 2 for this use.</td>
<td>There would be no change in use of Totten Inlet by bird species if the No Action Alternative were selected.</td>
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<td>Noise generated by marine vessels, hand tools and disturbance associated with human maintenance and harvesting activities associated with the Alternative 1 raft configuration would be similar to baseline activities at existing mussel farms in Totten Inlet at Gallagher Cove and Deepwater Point. While some marine mammals may avoid the North Totten Inlet mussel farm site temporarily, they would be expected to return when human disturbances cease.</td>
<td>Same as Alternative 1.</td>
<td>There would be no change related to marine mammal species with the No Action Alternative.</td>
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<td>There would be little or no risk of adverse impact to bald eagles, marbled murrelets, bull trout, Puget Sound Chinook salmon, steelhead trout, or Southern Resident killer whales during construction or operation of the proposed mussel farm in the Alternative 1 configuration. Noise from hand tools and disturbance from human activity is expected to be temporary, occasional, and minor.</td>
<td>Same as Alternative 1.</td>
<td>There would be no change in use of Totten Inlet by protected, threatened, or endangered species if the No Action Alternative were selected.</td>
</tr>
<tr>
<td><strong>Navigation: Construction</strong></td>
<td>There would be no impacts to navigation during the fabrication and assembly of rafts to create the North Totten Inlet mussel farm, as these activities would occur on land.</td>
<td>Same as Alternative 1.</td>
<td>There would be no change in obstructions to navigation in North Totten Inlet if the No Action Alternative were selected.</td>
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Table 2.6-1. Comparison of the environmental impacts of the alternatives, *continued*.

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<tr>
<td>Navigation: Operation</td>
<td>No safety hazards to vessel navigation within Totten Inlet would be anticipated in the developed and operational condition of the Alternative 1 configuration of the North Totten Inlet mussel farm. The structure would be equipped with all private aids to navigation required by the U.S. Coast Guard (USCG). The USCG has no record of a precedent indication that mussel rafts so-equipped cause a safety hazard to navigation within Totten Inlet.</td>
<td>Same as Alternative 1, though there would be two additional raft units in the Alternative 2 configuration.</td>
<td>Same as above.</td>
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